Kramer Electronics, Ltd.

USER MANUAL

Model:

FC-1ETHN

Ethernet Controller

Contents

Figures

Tables

This addendum describes an upgrade to the FC-1ETHN: the Virtual Serial Port.

Amendment to Section 3

The following text on page 2 is deleted:

- Is compatible with the latest Kramer K-Router Windows®-based control software (version 4.0 or higher) whose user-friendly interface now allows Kramer switchers to be controlled via Ethernet

The following text is inserted immediately prior to section 3.1:

The **FC-1ETHN** now includes the Virtual Serial Port Driver for compatibility with applications based on COM-port communication. The Virtual Serial Port:

- Makes the **FC-1ETHN** compatible with all Windows®-based applications which work through an actual COM port. This includes all versions of K-Router and other Kramer control applications. It lets you operate all RS-232 and RS-485 controllable devices via Ethernet LAN using their existing PC software

- Operates like an actual hardware port, that is, a logical COM that behaves like a standard hardware COM but in reality transparently reroutes the data using the TCP/IP network to the **FC-1ETHN** interface via a Virtual Null-modem connection, which you can emulate over the Ethernet or Internet

- Can be created in any quantity on your PC and does not occupy an actual serial port

Amendment to Section 5

In Table 3: "FC-1ETHN Configuration Manager Window Functionality" (on page 6), item 6 is replaced as follows:

6	Serial Setting	In the serial setting speed list, click the appropriate baud speed[1] (1200, 2400, 4800, 9600, 19200, 38400, 57600).

Note: the **FC-1ETHN does not support 115200 baud rate**.

Amendment to Section 6

The following new section, section 6.4 "Configuring the FC-1ETHN via its Virtual Port", is inserted immediately prior to section 7:

To configure the **FC-1ETHN** via the Virtual Port, do the following:

- Download the Virtual Serial Port Driver at this URL: http://www.kramerelectronics.com/support/bottom1.htm and follow the on-screen instructions:

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1 The configuration baud is factory preset, and fixed, at 9600
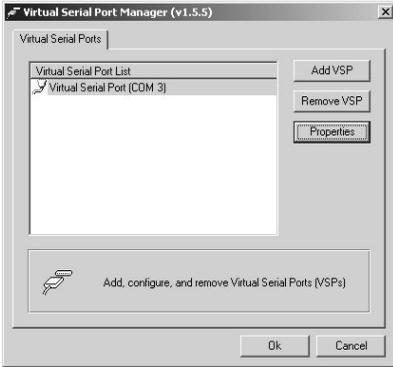
Figure A1: Virtual Serial Port Manager   *Figure A2: Virtual Serial Port Properties*
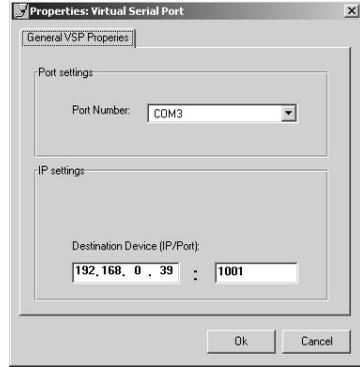
Amendment to Section 7

In section 7.1 (on page 11) steps 5, 6, and 7 are replaced by the following:

5. Connect the ETHERNET port of your **FC-1ETHN** to a LAN, using a straight-through cable with RJ-45 connectors.
   You can control from up to three computers (each with the Kramer Windows®-control software).

6. Run the Kramer Windows®-control software to control the Kramer machine from each computer.
   When working with a non-Kramer device, use their existing PC software or the Microsoft HyperTerminal.

7. In the K-Router Port window, choose the COM port according to the number of your virtual Serial port:

In section 7.1 (on page 11) Figure 6 is replaced by the following:
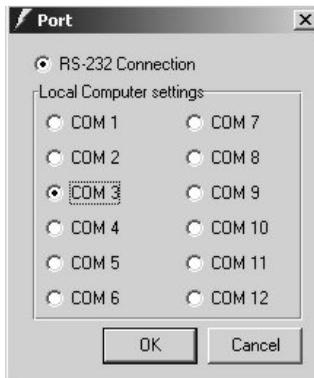
Figure A3: Choosing the COM Port

This addendum adds the following information to the user manual:

Caution – No operator-serviceable parts inside unit.

Warning – Use only the Kramer Electronics input power wall adapter that is provided with this unit[1].

Warning – Disconnect power and unplug unit from wall before installing or removing device or servicing unit.

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1 For example: model number AD2512C, part number 2535-000251

This addendum describes the correct wiring for crossover cable connections and replaces the opening paragraph in the "Connecting the ETHERNET Port directly to a PC (Crossover Cable)" section in the User Manual as follows:

Connecting the ETHERNET Port directly to a PC (Crossover Cable)

You can connect the Ethernet port of the machine to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

Table 1 and Figure 1 define the color codes for the two existing standard types of cross cables used in the industry. Table 2 defines how to connect the wires to the connectors on both ends of the cable.

When manually connecting the ends of a cable, both connectors must follow the same standard (either EIA /TIA 568A or EIA /TIA 568B).

Table 1: Crossover Cable RJ-45 Types

EIA /TIA 568B		EIA /TIA 568A	
PIN	**Wire Color**	**PIN**	**Wire Color**
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown
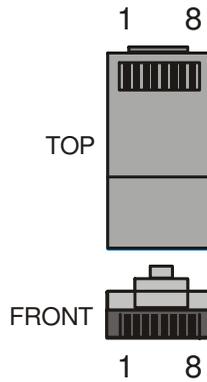
Figure 1: RJ-45 PINOUT

Table 2: Wiring between Connector One and Two of the Cable

Signal Pairs	PINs on Connector One	PINs on Connector Two	Signal Pairs
TX_D1+	1	3	RX_D2+
TX_D1-	2	6	RX_D2-
RX_D2+	3	1	TX_D1+
RX_D2-	6	2	TX_D1-
BI_D3+	4	7	BI_D4+
BI_D3-	5	8	BI_D4-
BI_D4+	7	4	BI_D3+
BI_D4-	8	5	BI_D3-

1 Introduction

Dedication by Kramer Electronics since 1981, to the development and manufacture of high quality video/audio equipment, makes the Kramer line an integral part of the finest production and presentation facilities in the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better! The Kramer line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to the **FC-1ETHN** *Ethernet Controller*, we also offer excellent switchers and matrices, distribution amplifiers, presentation processors, interfaces, remote controllers and computer-related products.

Congratulations on purchasing your Kramer TOOLS **FC-1ETHN** *Ethernet Controller*, which is ideal for use with Ethernet / RS-232 interface and Ethernet / RS-485 interface. The package includes the following items:

- **FC-1ETHN** *Ethernet Controller*
- Power adapter (12V DC Input)
- Windows®-based control software, and Configuration Manager software
- Null-modem adapter
- This user manual[1] and the Kramer concise product catalog/CD

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[2]

3 Overview

The high performance **FC-1ETHN** *Ethernet Controller*—an upgrade on the **FC-1ETH**—is an easy-to-use, compact, bi-directional hardware and software interface system for controlling most Kramer RS-232 and/or RS-485 controllable machines via Ethernet LAN, as well as via the Internet.

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1 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com/manuals.html

2 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com (click "Cables and Connectors" in the Products section)

In particular, the **FC-1ETHN**:

- Offers network connectivity that lets you connect a Kramer (or other) device via its RS-232 or RS-485 port to the Ethernet LAN network

- Lets you control an RS-232 / RS-485 device via Ethernet, from a PC (set to Slave routing mode) or other protocol compatible remote controller[1]

- Lets you control a device from up to three Ethernet points (PCs or remote controllers)

- Includes Windows®-based Configuration Management software for serial and network programming (including routing mode settings, network settings, serial settings, and destination device settings)

- Is compatible with the latest Kramer K-Router Windows®-based control software (version 4.0 or higher) whose user-friendly interface now allows Kramer switchers to be controlled via Ethernet

- Supports easy dial-up and Internet system remote control (requiring only a dedicated IP address and a modem in the remote location) whether it is a standalone PC or a LAN system

- Supports using wireless, 802.11b standard based LAN systems for control

- Has capability to facilitate a built-in Web page server

3.1 Terminology Used in this User Manual

Table 1 defines some terms that are used in this user manual:

Table 1: Terminology Used in this User Manual

Term	Definition
802.3	The standard specification for ETHERNET that is maintained by the Institute of Electrical and Electronics Engineers (IEEE).
Dynamic Host Configuration Protocol (DHCP)	Allows the network administrator to distribute IP addresses from a central point and automatically send a new IP address when an Ethernet point is plugged into a different network location.
Gateway	A network position serving as an entry to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node.
IP Address	A 32-binary digit number that identifies each sender or receiver (within a network via a particular server or workstation) of data (HTML pages or e-mails) that is sent in packets across the Internet.
Local Area Network (LAN)	Computers sharing a common communications line or wireless link, which often share a server within a defined geographic area.
Media Access Control (MAC) Address	A computer's unique hardware number in a LAN or other network. On an Ethernet LAN, the (MAC) address is identical to the Ethernet address.
Transmission Control Protocol/Internet Protocol (TCP/IP)	The basic communication language or protocol of the Internet that breaks the message into appropriately sized packets for the network, and can be used as a communications protocol in an intranet or an extranet.

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1 When using two FC-1ETHN units, both set to Master routing mode

3.2 Achieving the Best Performance

Achieving the best performance means:

- Connecting only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)

- Avoiding interference from neighboring electrical appliances and positioning your **FC-1ETHN** away from moisture, excessive sunlight and dust

4 Your FC-1ETHN Ethernet Controller

Figure 1 and Table 2 define the **FC-1ETHN** *Ethernet Controller*:
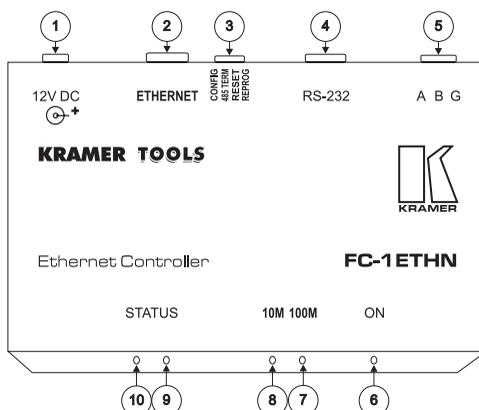
Figure 1: FC-1ETHN Ethernet Controller

Table 2: Features and Functions of the FC-1ETHN Ethernet Controller

#	Feature			Function
1	12V DC			+12V DC connector for powering the unit
2	ETHERNET port			Connects to your LAN
3	Dipswitches	4	CONFIG	Used to configure the system
		3	485 TERM	Used to terminate the RS-485 line
		2	RESET	Used to reset the unit
		1	REPROG	Used to upgrade the firmware
4	RS-232 port			Connects to the RS-232 DB 9 port on a Kramer (or other) device or PC
5	*A B G* (RS-485) port			Connects to the RS-485 port on a Kramer (or other) device PIN A connects to the "A" (+) PIN; PIN B connects to the "B" (–) PIN; and PIN G connects to the "G (Ground)" PIN
6	*ON* LED			Illuminates when receiving power
7	*100M* LED			Lights when the speed is 100M
8	*10M* LED			Lights when the speed is 10M
9	STATUS LED			Ready for communication if one STATUS LED flashes; communication already exists if both STATUS LEDs flash
10	STATUS LED			

5   Using the Kramer Configuration Manager Software

This section describes:

- How to install and run the Configuration Manager software, see section 5.1
- The Configuration Manager Window features, see section 5.2

5.1 Installing and Running the Kramer Configuration Manager Software

To install the Kramer Configuration Manager software:

- Insert the CD-ROM in the CD-ROM drive, double click the Setup.exe file and follow the on-screen instructions

To run the Kramer Configuration Manager software (for the first time):

1. Click the appropriate shortcut in the Start menu's Programs folder. The Choose Port window appears as follows:
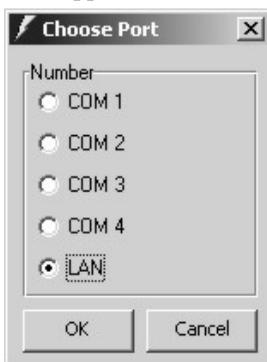
Figure 2: Choose Port Window

2. Choose the LAN port for configuration via Ethernet, or the appropriate COM port for configuration via serial cable (see section 6.1) and click OK. The **FC-1ETHN** Configuration Manager window (see Figure 3) opens.

To run the Kramer Configuration Manager software (subsequently):

- Click the appropriate shortcut in the Start menu's Programs folder. The **FC-1ETHN** Configuration Manager window (see Figure 3) opens

5.2 Understanding the Kramer Configuration Manager Window

Figure 3 and Table 3 define the **FC-1ETHN** Configuration Manager window:

KRAMER ELECTRONICS, LTD.
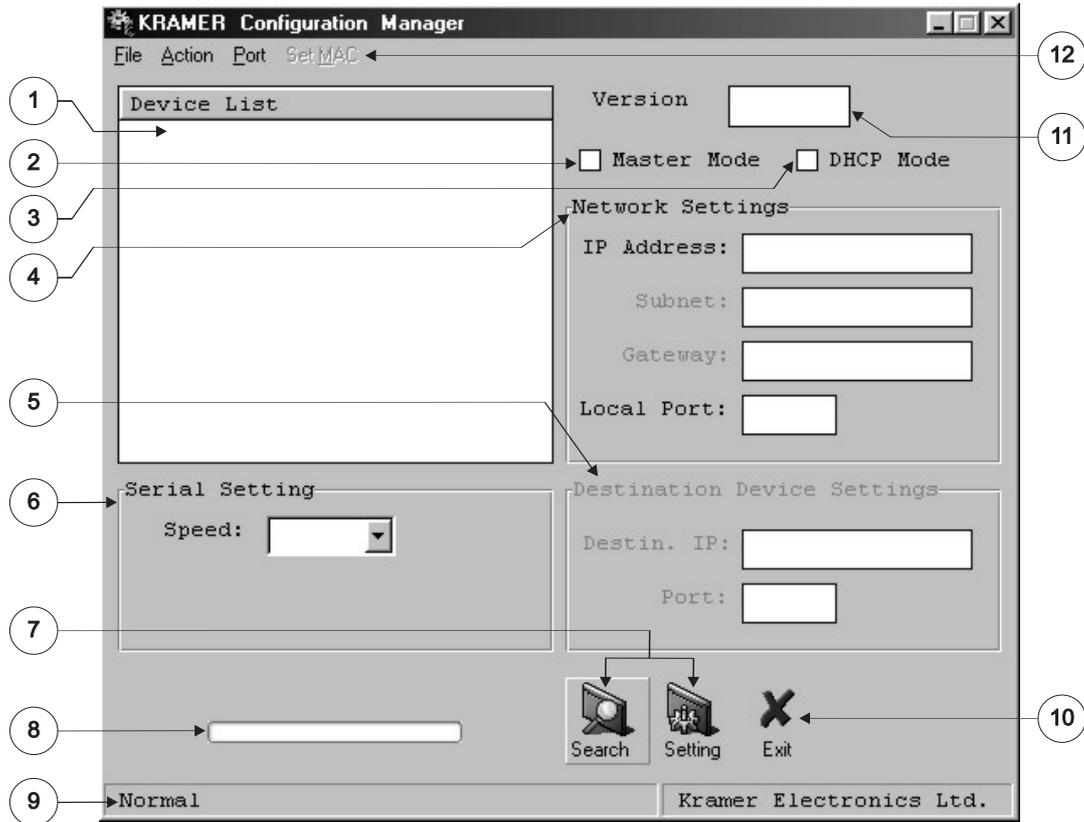
Figure 3: FC-1ETHN Configuration Manager Window

Table 3: FC-1ETHN Configuration Manager Window Functionality

#	Feature	Function
1	Device List	Displays the MAC Addresses for the FC-1ETHN devices, connected via the selected port (LAN or COM).
2	Master Mode Check Box	When selected, activates the Master mode (see section 6.3.2). When cleared, activates the Slave mode (see section 6.3.1).
3	DHCP[1] Mode Check Box	When selected, automatically configures the FC-1ETHN to obtain an IP address from the network administrator via the Dynamic Host Configuration Protocol (DHCP) When cleared, manual configuration of the FC-1ETHN is required to obtain an IP address (Static IP)
4	Network Settings	**IP Address**: A 32-binary digit number obtained from your Network Administrator that identifies the FC-1ETHN device that is currently being configured in the Ethernet or Internet. **Subnet**: A 32-binary digit number obtained from your Network Administrator, which combined with the IP Address, identifies which network your FC-1ETHN device is on. **Gateway**: A network position serving as an entry to another network or to the Internet (only relevant in the Master Routing mode). **Local Port** is an address of the FC-1ETHN device that is currently being configured that provides a direct route from another Ethernet point application.	For example: Network Settings — IP Address: 192.168.0.39 — Subnet: 255.255.255.0 — Gateway: 192.168.0.1 — Local Port: 1001
5	Destination Device Settings	**Destin. IP** A 32-binary digit number that identifies the destination FC-1ETHN device in the Ethernet or Internet. **Port** is a pre-assigned address of the destination FC-1ETHN device that provides a direct route to its Transport layer.	For example: Destination Device Settings — Destin. IP: 192.168.0.40 — Port: 1001
6	Serial Setting	In the serial setting speed list, click the appropriate baud speed[2] (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200).
7	Action Buttons	**Search**: seeks the FC-1ETHN devices that connect to the PC via the chosen LAN or COM port, and displays them and their corresponding settings.
		Setting: adjusts the FC-1ETHN according to the displayed data.
8	Progress Bar	Shows the progress
9	Status Bar	Shows the status
10	Exit Button	Closes the Configuration Manager application
11	Version	Displays the firmware version number
12	Menu bar	**File** menu's Exit command closes the Configuration Manager application. **Action** menu's Search Board command seeks the FC-1ETHN devices that connect to the PC via the chosen LAN or COM port, and displays them and their corresponding settings. **Action** menu's Setting command adjusts the FC-1ETHN according to the displayed data. **Port** menu displays the Choose Port window. **Set MAC**[1] menu is for factory use only (click the Password command to enter the password).

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1 See definition in Table 1

2 The configuration baud is factory preset, and fixed, at 9600

6 Configuring the FC-1ETHN Ethernet Controller

This section describes how to configure the **FC-1ETHN** via its:

- Serial[1] port, see section 6.1
- ETHERNET[1] port, see section 6.2

6.1 Configuring the FC-1ETHN via its Serial Port

You can configure the **FC-1ETHN** via its RS-232 port.

To configure the **FC-1ETHN** via RS-232, do the following:

1. Set the CONFIG DIP[2] (DIP 4) to ON.
   Leave the other three DIPs[3] set to OFF.

2. Connect the RS-232 port of the **FC-1ETHN** to the Null-modem adapter and connect the Null-modem adapter with a 9 wire flat cable to the RS-232 DB9 COM port on your PC.

3. Run the Kramer Configuration Manager software (see section 5.1) and choose the COM port that is appropriate for your computer from the **FC-1ETHN** Configuration Manager window (see section 5.2).

4. Click the Search button (or the Action menu's, Search Board command). The MAC Address for the found "**FC-1ETHN**" appears in the Device List.

5. Change the settings and then click the Setting button (or the Action menu's, Setting command) to apply the settings.
   Note: be aware that this will alter the IP settings in the FC-1ETHN.

6. Set the CONFIG DIP[2] (DIP 4) to OFF.
   Leave the other three DIPs[3] set to OFF.

7. Disconnect the power to the **FC-1ETHN**, and then reconnect it.

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1 The serial mode is always available even if the FC-1ETHN is not correctly setup, whereas the Ethernet mode is not a separate mode and can proceed in parallel with the normal operation of the FC-1ETHN

2 See item 3 in Table 2

3 485 TERM (DIP 3), RESET (DIP 2), and REPROG (DIP 1)

6.2 Configuring the FC-1ETHN via its ETHERNET port

You can configure the **FC-1ETHN** via its ETHERNET port.

To configure the **FC-1ETHN** via ETHERNET, do the following:

1. Connect the ETHERNET port of the **FC-1ETHN** to the LAN port on your PC, via a crossover cable with RJ-45 connectors, as Table 4 defines:

Table 4: Crossover Cable RJ-45 PINOUT

Side 1			Side 2	
PIN	**Wire Color**		**PIN**	**Wire Color**
1	White-orange		1	White-green
2	Orange		2	Green
3	White-green		3	White-orange
4	Blue		4	Blue
5	White-blue		5	White-blue
6	Green		6	Orange
7	White-brown		7	White-brown
8	Brown		8	Brown

If connecting the ETHERNET port of the **FC-1ETHN** to the LAN port on a network hub or network router, use a straight-through cable with RJ-45 connectors, as Table 5 defines:

Table 5: Straight-through Cable RJ-45 PINOUT

Side 1			Side 2	
PIN	**Wire Color**		**PIN**	**Wire Color**
1	White-orange		1	White-orange
2	Orange		2	Orange
3	White-green		3	White-green
4	Blue		4	Blue
5	White-blue		5	White-blue
6	Green		6	Green
7	White-brown		7	White-brown
8	Brown		8	Brown

2. Run the Kramer Configuration Manager software (see section 5.1) and choose the LAN port (see Figure 2).

3. Click the Search button (or the Action menu's, Search Board command). The MAC Address for the found "**FC-1ETHN**" appears in the Device List.

4. Change the settings and then click the Setting button (or the Action menu's, Setting command) to apply the settings.
Note: be aware that this will alter the IP settings in the FC-1ETHN.

6.3 Routing Data in the Slave and Master Routing Modes

The **FC-1ETHN** routes data in either the Slave Routing Mode (see section 6.3.1) or the Master Routing Mode (see section 6.3.2).

6.3.1   Slave Routing Mode

In the Slave Routing Mode, the **FC-1ETHN** never sends any data in the serial port-Ethernet direction before it first receives some data from the remote station (that is, the data in the Ethernet-serial direction). Serial data that is received at the serial port of the **FC-1ETHN** before the remote station contacts the **FC-1ETHN** is discarded. In the Slave Mode, the **FC-1ETHN** will work with any station on the network that contacts it (but not more than three stations simultaneously), as the example in Figure 4 illustrates:
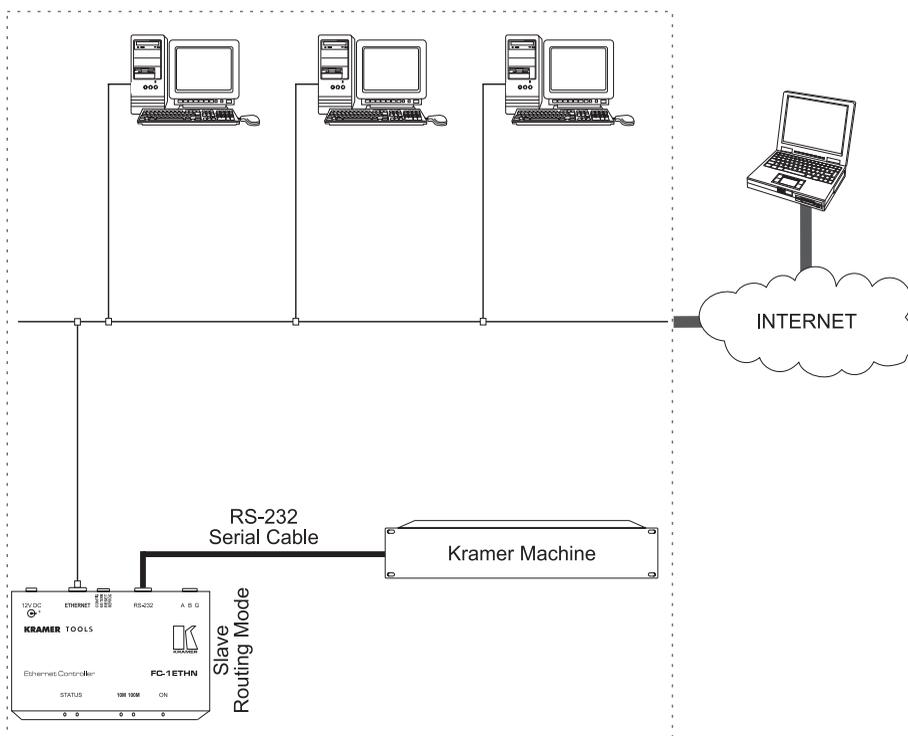

Figure 4: Connecting the FC-1ETHN in the Slave Routing Mode

6.3.2   Master Routing Mode

In the Master Routing Mode, the **FC-1ETHN** does not wait for the remote station to send the data first, and routes the data in the destination device direction as soon as there is data to be sent. The data is always sent to a specific destination (as defined by the Destination IP address and Destination Data Port Number Settings of the **FC-1ETHN**). Also, the **FC-1ETHN** only accepts the data sent from the remote station whose IP address matches the one set in the Destination IP address. The **FC-1ETHN** will discard the data sent from any other IP. See the example illustrated in Figure 5:
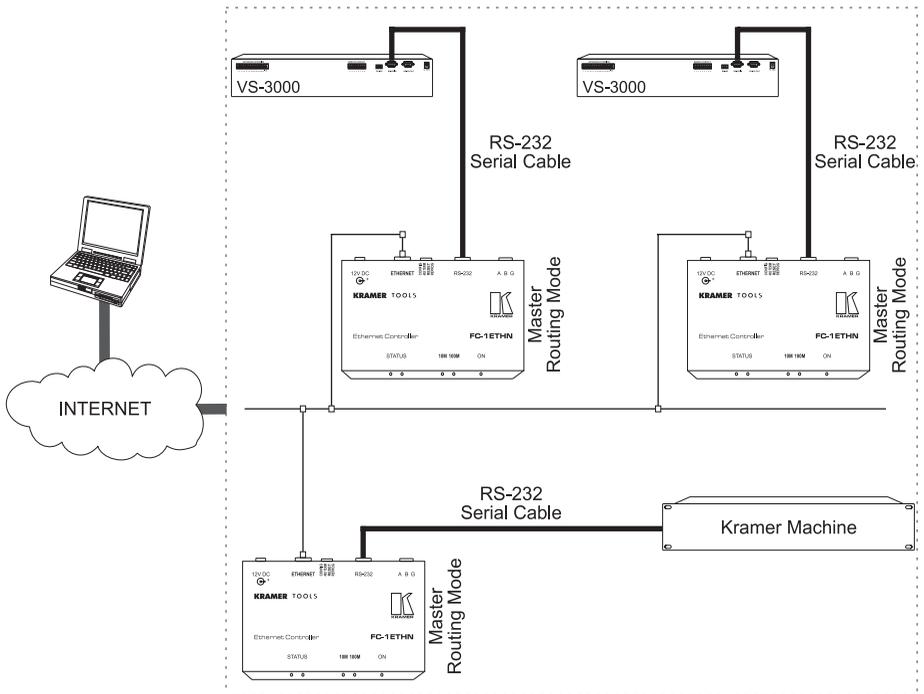

Figure 5: Connecting the FC-1ETHN in the Master Routing Mode

7   Controlling Kramer Machines via Ethernet using the FC-1ETHN

You can use your **FC-1ETHN** to control a Kramer machine from computers that connect to a LAN[1] (see section 7.1) or via a controller[1] (see section 7.2).

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1 As well as via an Internet connection

7.1 Controlling a Kramer Machine via a Computer

To control a Kramer machine via three computers, as the example in Figure 4 illustrates, do the following:

1. Configure the **FC-1ETHN** to the Slave Routing Mode (see section 6).

2. Set all the DIPs to OFF.

3. Connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity.

4. Connect the RS-232 port of your Kramer machine to the RS-232 port of the **FC-1ETHN** via a Null modem (alternatively, connect the RS-485 port of your Kramer machine to the ABG port[1] of the **FC-1ETHN**).

5. Connect the ETHERNET port of your **FC-1ETHN** to a LAN, using a straight-through cable with RJ-45 connectors.
   You can control from up to three computers (each with the Kramer K-Router Windows®-control software (version 4.0 or higher)).

6. Run the Kramer K-Router Windows®-control software (version 4.0 or higher) to control the Kramer machine from each computer.
   Use the Microsoft HyperTerminal if working with a non-Kramer device.

7. In the K-Router Port window, click the Remote Connection option and set the RemoteHost and RemotePort, as per the **FC-1ETHN** configuration:
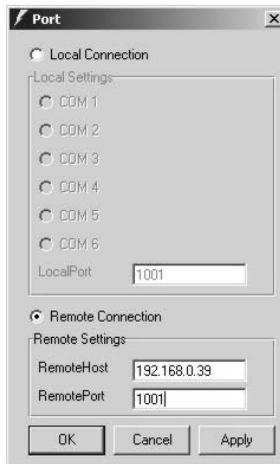

Figure 6: Connecting the FC-1ETHN in the Master Routing Mode

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1 Connect PIN A to the "A" (+) PIN, PIN B to the "B" (–) PIN, and PIN G to the "G (Ground)" PIN

7.2 Controlling a Kramer Machine via a Controller

To control a Kramer machine via two **VS-3000** controllers, as the Master Mode example in Figure 5 illustrates, do the following:

1. Configure each **FC-1ETHN** to the Master Routing Mode (see section 6).

2. Set all the DIPs to OFF on each **FC-1ETHN**.

3. Connect the RS-232 port of your Kramer machine to the RS-232 port of a **FC-1ETHN** via a Null modem (alternatively, connect the RS-485 port of your Kramer machine to the ABG port[1] of the **FC-1ETHN)** and connect the ETHERNET port of that **FC-1ETHN** to a LAN.

4. Connect the ETHERNET port of another **FC-1ETHN** to the same LAN and connect the RS-232 port of the controller to the RS-232 port of that **FC-1ETHN** (alternatively, connect the RS-485 port of the controller to the ABG port[1] of the **FC-1ETHN**).

5. Connect the ETHERNET port of another **FC-1ETHN** to the same LAN and connect the RS-232 port of the controller to the RS-232 port of that **FC-1ETHN** via a Null modem (alternatively, connect the RS-485 port of the controller to the ABG port[1]of the **FC-1ETHN**).

6. On each **FC-1ETHN**, connect the 12V DC power adapter to the power socket and connect the adapter to the mains electricity.

8 Flash Memory Upgrade

The **FC-1ETHN** firmware is located in FLASH memory, which lets you upgrade to the latest Kramer firmware version in minutes! The process involves:

- Downloading from the Internet (see section 8.1)
- Connecting the PC to the RS-232 port (see section 8.2)
- Upgrading Firmware (see section 8.3)

8.1 Downloading from the Internet

You can download the up-to-date file from the Internet. To do so:

1. Go to our Web site at http://www.kramerelectronics.com and download the file: "*FLIP_ FC1ETHN.zip*" from the Technical Support section.

2. Extract the file: "*FLIP_ FC1ETHN.zip*" to a folder (for example,

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1 Connect PIN A to the "A" (+) PIN, PIN B to the "B" (–) PIN, and PIN G to the "G (Ground)" PIN

C:\Program Files\Kramer Flash).

3.   Create a shortcut on your desktop to the file: "*FLIP.EXE*".

8.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer firmware version on a **FC-1ETHN** unit, do the following:

1.   Connect the RS-232 DB9 port on the **FC-1ETHN** to the Null-modem adapter and connect the Null-modem adapter with a 9 wire flat cable to the RS-232 DB9 COM port on your PC.
It is recommended that you use COM port[1] 2. However, if your computer has only one COM port, open the file: "*FC1ETHN.cfg*" (located at C:\Program Files\Kramer Flash\ FC1ETHN.cfg) in **Notepad**, and change "*set port COM2*" to "*set port COM1*".

2.   Connect the power on the **FC-1ETHN** unit.

3.   Set the DIP 1 REPROG to ON.

8.3 Upgrading Firmware

Follow these steps to upgrade the firmware:

1.   Double click the desktop icon: "*Shortcut to FLIP.EXE*".
The Splash screen appears as follows:

Figure 7: Splash Screen

2.   After a few seconds, the Splash screen is replaced by the "*Atmel – Flip*" window:

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1 The software is preset for use with COM port 2
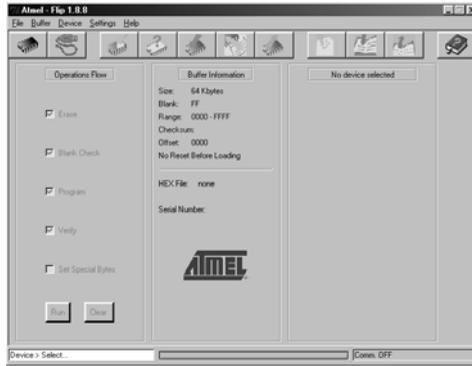
Figure 8: Atmel – Flip Window

3.   Press the keyboard shortcut key *F4* (or select the "*Read Configuration File*" command from the *File* menu, or press the keys: *Alt FR*).
The "*Open Configuration File*" window appears:
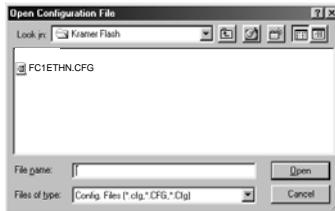
Figure 9: Open Configuration File Select Window

4.   Choose the file: "*FC1ETHN.cfg*" (by double-clicking it).
If COM 2 was not selected (see section 8.2), an RS-232 error message appears. In the "*Atmel – Flip*" window, the *Operations Flow* column is disabled, and crosses appear in the third column.
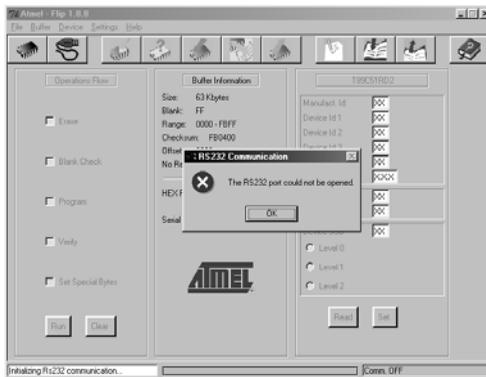

Figure 10: Atmel – Flip Window (RS-232 Communication)

5. Click OK and press the keyboard shortcut key *F3* (or select the "*Communication / RS232*" command from the *Settings* menu, or press the keys: *Alt SCR*).

The "*RS232*" window appears. Change the COM port:
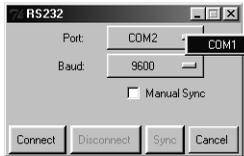
Figure 11: RS-232 Window

6. Click Connect.

In the "*Atmel – Flip*" window, in the *Operations Flow* column, the *Run* button is active, and the name of the chip appears as the name of the third column: *AT89C51RD2*.

Verify that in the *Buffer Information* column, the "*HEX File: FC1ETHN.hex*" appears.
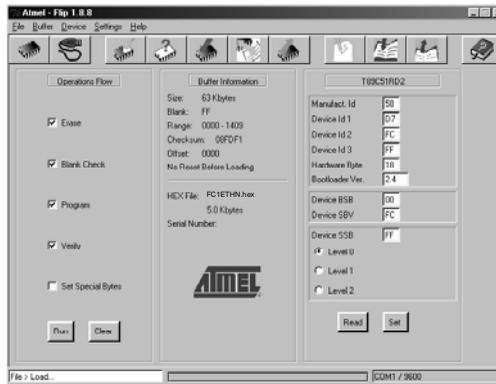
Figure 12: Atmel – Flip Window (Connected)

7. Click *Run*.

After each stage in the operation is completed, the check-box for that stage becomes colored green[1].

When the operation is completed, all 4 check-boxes will be colored green and the status bar message: *Memory Verify Pass* appears[2]:

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1 See also the blue progress indicator on the status bar

2 If an error message: "Not Finished" shows, click Run again

Figure 13: Atmel – Flip Window (Operation Completed)

8. Close the "*Atmel – Flip*" window.

9. Disconnect the power on the **FC-1ETHN**.

10. Disconnect the RS-232 port on the **FC-1ETHN** from the Null-modem adapter.

11. Set DIP 1 REPROG to OFF.

12. Reconnect the power on the **FC-1ETHN**.

9 Technical Specifications

Table 6 includes the technical specifications:

Table 6: Technical Specifications[1] of the FC-1ETHN Ethernet Controller

ETHERNET INTERFACE:	10/100 BaseT Ethernet
SERIAL INTERFACES:	RS-232, DB9M, signals: RX, TX, RTS, CTS, Ground RS-485
NETWORK PROTOCOLS:	ICMP (ping), ARP, TCP, UDP
POWER SOURCE:	12 VDC, <80mA
DIMENSIONS:	12cm x 7.5cm x 2.5cm (4.7" x 2.95" x 0.98"), W, D, H
WEIGHT:	0.3 kg. (0.66 lbs.) approx.
ACCESSORIES:	Power supply, mounting bracket

1 Specifications are subject to change without notice

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC);
	generic emission standard.
	Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard.
	Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations:
	Part 15: "Radio frequency devices
	Subpart B – Unintentional radiators"

CAUTION!

   ⊠ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
   ⊠ Use the supplied DC power supply to feed power to the machine.
   ⊠ Please use recommended interconnection cables to connect the machine to other components.

**For the latest information on our products and a list of Kramer
distributors, visit our Web site: www.kramerelectronics.com.
Updates to this user manual may be found at
http://www.kramerelectronics.com/manuals.html.
We welcome your questions, comments and feedback.**